**TOTAL QUALITY MANAGEMENT
IN RESEARCH INSTITUTES IN GREECE**

by
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Abstract

Maria Constantina Tzoannou: Total Quality Management in Research
Institutes in Greece
(Under the supervision of Mr. Athanasios Kriemadis, Professor).

The purpose of this study was to determine the extent to which total quality management is being used in research institutes in Greece via: (1) 10 common quality tools and techniques and (2) specific characteristics of the organization, that are specified in the Total Quality Management Assessment Inventory by Sashkin and Kiser (1992). The majority of research institutes in Greece are public or Non Profit Private Legal Entities ("NPID" under Greek Law), supervised by the Greek government through the Ministry of Education, Lifelong Learning and Religious Affairs (since 2009).

The research questions examined in this study were as follows:

1. What is the extent to which 10 common quality tools and techniques of total quality management are being used in research institutes in Greece?

2. What is the extent to which 39 characteristics (practices, policies, procedures) of total quality management are being applied in research institutes in Greece?

The survey instrument used to measure the extent to which total quality management is being used in research institutes in Greece was the Total Quality Management Assessment Inventory by Sashkin and Kiser (1992).

The findings of this study were as follows:

1. Greek research institutes use specific and structured quality improvement techniques, receive training in the importance of quality, participate in quality circles and receive training in statistical process control, to a slight extent.

2. Two policies that are applied completely in Greek research Institutions are firstly that there is no downsizing or staff reductions, unless there is retirement or normal turnover in the horizon and secondly, that people feel secure in their jobs as it is unusual for anyone to be fired without a very clear cause.

3. What applies mostly in the organization is that there is coordination achieved through cooperation and collaboration between individuals and

among teams as well, and that managers keep their word when they agree to do something.

ΠΕΡΙΛΗΨΗ

Μαρία Κωνσταντίνα Τζοάννου: Διοίκηση Ολικής Ποιότητας στα Ερευνητικά
Κέντρα στην Ελλάδα
(Με την επίβλεψη του κ Αθανάσιου Κριεμάδη, Καθηγητής)

Σκοπός αυτής της έρευνας ήταν να προσδιοριστεί η έκταση στην οποία
χρησιμοποιείται η διοίκηση ολικής ποιότητας στα ερευνητικά κέντρα στην
Ελλάδα μέσω: (1) 10 κοινά εργαλεία και τεχνικές ποιότητας και (2)
συγκεκριμένα χαρακτηριστικά του οργανισμού, που ορίζονται στο
ερωτηματολόγιο «Total Quality Management Assessment Inventory» των
Sashkin και Kiser (1992). Η πλειοψηφία των ερευνητικών κέντρων στην
Ελλάδα είναι δημόσια ή νομικά πρόσωπα ιδιωτικού δικαίου («ΝΠΙΔ» βάση της
Ελληνικής Νομοθεσίας), εποπτευόμενα από την Ελληνική κυβέρνηση μέσω
του Υπουργείου Παιδείας και Θρησκευμάτων, Πολιτισμού και Αθλητισμού
(από το 2009).

Τα ερευνητικά ερωτήματα που εξετάζονται σε αυτήν την έρευνα ήταν τα εξής:

1. Ποια είναι η έκταση στην οποία εφαρμόζονται 10 κοινά εργαλεία και
τεχνικές διοίκησης ολικής ποιότητας στα ερευνητικά κέντρα στην Ελλάδα;

2. Ποια είναι η έκταση στην οποία εφαρμόζονται 39 χαρακτηριστικά
(πρακτικές, πολιτικές, διαδικασίες) της διοίκησης ολικής ποιότητας στα
ερευνητικά κέντρα στην Ελλάδα?

Το εργαλείο μέτρησης που χρησιμοποιήθηκε για να μετρηθεί η έκταση στην
οποία η διοίκηση ολικής ποιότητας εφαρμόζεται στα ερευνητικά κέντρα στην
Ελλάδα ήταν το «Total Quality Management Assessment Inventory» των
Sashkin και Kiser (1992).

Τα ευρήματα της έρευνας ήταν τα εξής:

1. Τα Ελληνικά ερευνητικά εργαστήρια χρησιμοποιούν συγκεκριμένες και
δομημένες τεχνικές βελτίωσης ποιότητας, εκπαιδεύονται στην σπουδαιότητα
της ποιότητας, συμμετέχουν σε κύκλους ποιότητας και εκπαιδεύονται στον
έλεγχο στατιστικών διαδικασιών, σε ελάχιστο βαθμό.

2. Δύο πολιτικές που εφαρμόζονται ολοκληρωτικά στα Ελληνικά ερευνητικά
κέντρα είναι πρώτον ότι δεν γίνεται μείωση του προσωπικού, εκτός εάν
υπάρχει συνταξιοδότηση/φυσιολογική ανανέωση προσωπικού και δεύτερον,

ότι οι άνθρωποι αισθάνονται σίγουροι στην εργασία τους καθώς είναι ασυνήθιστο να απολυθεί κάποιος χωρίς ξεκάθαρη αιτία.

3. Αυτό που εφαρμόζεται ως επί το πλείστον στον οργανισμό είναι ότι υπάρχει συντονισμός που επιτυγχάνεται μέσα από την συνεργασία ανάμεσα στα άτομα και τις ομάδες, και ότι τα ανώτερα στελέχη κρατάνε το λόγο τους όταν συμφωνούν να κάνουν κάτι.

Λέξεις - Κλειδιά: εργαλεία και τεχνικές ποιότητας, χαρακτηριστικά του οργανισμού.

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I. INTRODUCTION

The research subject that is going to be presented in this study concerns the extent of use of Total Quality Management (TQM) in research institutes in Greece. More specifically, the study examines firstly the extent of use of ten common total quality tools and techniques and secondly, the extent of use of thirty nine policies and procedures in the organisation, in this case the research institution. The research approach is the quantitative one (conduct of a survey method) and the basic research tool for the quantitative method is the questionnaire, a text encouraging participants to answer on various scales about their views, attitudes and behaviours about the topic of the organisations' TQM tools, procedures and policies.

It is fundamental to make clear that the meaning of quality has to be interpreted according to research institutes. The task of research institutes is to develop innovative solutions that better the quality of life on the planet as it is known today. The quality objectives can be deduced from the understanding of quality that is appropriate for a research institute.

First of all, Mistry and Usherwood (2000), show that TQM is a management philosophy devised by the American W. Edwards Deming but first embraced by the Japanese. It is a philosophy that focuses relentlessly on the needs of the customer, both internal and external. The internal customer is the person that works for an organisation and the external customer is the person who receives products or services from the organisation. TQM realigns the organisation from detection to prevention and aims to improve continuously via the use of statistical monitoring.

According to Bayraktar, Tatoglou and Zaim (2008), based on the ideas of quality gurus including Juran, Feigenbaum, Deming and Crosby, total quality management includes organisation-wide efforts towards customer satisfaction through continuously increasing the performance of products, services and employees. The most attractive features of TQM are continuous learning, leadership and flexibility in the creation of an environment where organisation-wide goals are shared by everyone, and an organisation's processes are focused directly on customers. TQM is the culture of an organisation committed to customer satisfaction through continuous

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improvement. This culture varies from one country to another and between different industries, but has certain essential principles, which can be implemented to secure greater market share, increased profits and reduced costs.

Furthermore, Bayraktar et al. (2008) point out that to determine which factors of TQM are critical, already some of the most known instruments were developed by individual researchers and institutions, such as the Malcolm Baldrige Award, EFQM (European Foundation for Quality Management) and the Deming Prize Criteria. But in the literature many more can be found.

Further to the above, Pfeifer and Wunderlich (1997**)** point out that every project in research has different conditions and that circumstances are unique and new every time. This makes the particular needs of a research institute, a key. These needs include potential modification of initial objectives, since it is often unknown whether they can be met or not, financing and qualification of personnel. Also what has to be considered is, difficulty in measuring results, fluctuation of personnel, individual specific knowledge, high degree of innovation and time deadlines. Overall, the requirements of a total quality management system in a research institute have to be controlled but flexible processes in order to set a framework on which to continue improvement.

Consequently, according to Bayraktar et al. (2008) critical factors of TQM implementation in research institutes are institution-wide implementation of quality management, which in turn requires developing instruments to measure multidimensional features of quality management practices. This is the reason why there should fundamentally be a research that first of all measures the existing extent of use of TQM practises. From this base it can be much easier to proceed on bettering in general the management practices of the organization. This is the importance that the current research holds. Without a proper measurement system, shortcomings of the current implementation and areas of further improvements may not be easy to identify. Moreover, the type of activities carried out in manufacturing is not so different from those in research institutes in general in terms of TQM implementation scales that should be considered, such as: leadership, measurement and evaluation, process control and improvement, program design, quality system improvement, employee involvement, recognition and

reward, education and training and other stakeholders focus. So the above terms that are related to the present study and are expressed via the questionnaire used for the research part of the study, will be defined as follows:

Leadership

Top management of a research institution should be aware of the needs of TQM. These are understanding the importance of employee involvement; and concentrating on long-term stable performance measures while showing their support to TQM practices through their actions.

Measurement and Evaluation

In any organisation, the measurement of degree of success is an absolute necessity to identify the area of improvements. Measurement and then evaluation are nearly impossible without clearly defined performance measures, even though it is difficult to identify the ones universally accepted for all research institutes. While measurement of the administrative processes of a research institute is relatively simple, it is much more difficult to measure the level of success on other various processes that are difficult to group under specific labels. The attempts to identify the performance measures and evaluations of these measures are important indicators of TQM efforts.

Process Control and Improvement

This is a natural consequence of measurement and evaluation. As research institutes are ultimately service organisations (towards society) using several processes, they may require a different type of organisational structure. Administrative and research implementation processes should be measured, evaluated, controlled and improved regularly through comprehensive statistical data collection.

Program Design

Research programs are the main products of research institutions to attract and satisfy the needs of the stakeholders such as industry, academy and community at large. These programs should be reviewed regularly

considering the needs of the stakeholders and technological advances, and should be updated if necessary.

Quality System Improvement

A well-documented quality assurance system is needed in order to guarantee the consistency of the quality related issues in research institutes. Clearly stated process flow charts and documents may increase the consistency and traceability of the processes in case of error.

Employee Involvement

Without the clear support and contributions of the employees, a successful TQM implementation will not be accomplished. TQM is an organisation-wide effort to generate a quality culture. With active participation, negative attitudes of the employees towards TQM implementation may be eliminated.

Recognition and Reward

The recognition of excellence on TQM-related efforts by any employee, or institution should be rewarded as a means of supporting a particular performance level. In order to stimulate employee commitment to TQM implementation, performance measures for research institutes may need to be modified to take the quality efforts into consideration.

Education and Training

Educating and training employees on TQM implementation and its related consequences are crucial for the success of the program. The training needs of research and non-research staff should be identified separately and considered as a quality awareness workshop.

Other Stakeholders' Focus

The needs and expectations of a particular business or industry as well as society in general should be systematically observed and be considered as a feedback to research institutes' education programs. Employees are also highly important in delivering the actual services to the customers of research

institutions. The success of a TQM implementation program really centres on to what extent the employees are able to understand the whole process and vision of the institution.

Apart from the above terms defined it is believed according to Manivannan and Premila (2009) that what are considered to be essentially the pillars of quality in total quality management in any organisation are four driving forces, that move the organisation toward the full application of quality service. The four pillars of the House of Quality are customer service, continuous improvement, managing with facts and respect for people. All are distinct, but equal in potential strength. All four must be addressed, minimizing one weakens the others. By not addressing one, the entire House of Quality will fall. More specifically:

<u>Serving the Customer</u>

One truth has been proven repeatedly: customer-driven organizations are effective because they focus on a full commitment to satisfying, even anticipating, the needs of the customer. Those that are successful will be those that most clearly identify their mission and the customer-driven organizations are successful because they have a unified focus on what they do and who they serve.

<u>Continuous Improvement</u>

Continuous Improvement is both a commitment and a process. The commitment to quality is initiated with a statement of dedication to a shared mission and vision and the empowerment of all participants to incrementally move toward the vision. The process of improvement is accomplished through the initiation of small, short-term projects and tasks throughout the organisation, which collectively are driven by the achievement of the long-term vision and mission. Both are necessary; one cannot be done without the other.

<u>Managing with Facts</u>

This requires a substantial shift in many areas of higher education to a process of carrying out continuous improvement and effective process management through the extensive use of a variety of tools designed to gather and analyse data and make decisions based on facts.

<u>Respect for People</u>

The output of an organisation also encompasses the quality of life of every one who works in, or is affected by it. Fortunately, quality of output goes hand-in-hand with quality of work. The only way total quality will be attained is through total commitment and participation.

The purpose of the study is to determine the extent to which total quality management tools procedures and policies are used in Greek research institutes. By quantitatively determining the extent of use of TQM in research institutions the aim is to contribute to a deeper understanding of the way that Greek research institutes function as organizations from the viewpoint of total quality management and therefore it is possible to use the findings to better the management reality of a research institution, as a unique kind of organization that is neither purely business orientated nor purely orientated towards humanity. This knowledge may prove to be valuable not only for research institutes themselves but also as an asset to other fields of science that incorporate the knowledge of other scientific fields in their function.

The research questions that were addressed by this study were as follows:

1.   What is the extent to which 10 common quality tools and techniques of total quality management are being used in research institutes in Greece?

2.   What is the extent to which 39 characteristics (practices, policies, procedures) of total quality management are being applied in research institutes in Greece?

The limitations of the study that were acknowledged were the following:

1.   The honesty, accuracy and objectivity of the respondents when completing the questionnaire.

2.   The lack of time concerning the deadlines of the research and from behalf of the employees.

3.   Denial to participate in research with no profound reason.

Following there is a more extensive review of the literature.

II. LITERATURE REVIEW

This chapter presents a review of the literature that is related to the application of Total Quality Management (TQM) in research institutes. Also, there is an overview of TQM practices in research institutes, their evolution, and the dominant TQM practices/directions created and used.

One important point to begin with, as Brennan (2001) has shown, is that practicing TQM is choosing first of all the right individuals. So, individual attitudes reflect a specific mind set regarding TQM effectiveness and appropriateness, as observed in the USA. Brennan stressed that although management personnel is more positive towards TQM than non management personnel, both believe that TQM is better in theory rather than in practice, since it is accused for bureaucracy and useless development work.

This rises questions about the knowledge of the staff on TQM and about the measures that should be taken on this subject. As Pfeifer & Wunderlich (1997) note for Europe, there has been a high impact of quality systems - especially the ISO 9000 series -on competitiveness of European businesses, so not only traditional methods of management are not sufficient, but new strategies have to be applied as well. All organizations must face the task of analyzing and improving their structure and processes. Production industry has already successfully done this and public organizations, such as research institutes, have followed the example of the private sector making efforts to apply total quality.

Therefore, Pfeifer and Wunderlich (1997) point out that research institutes are pressured to apply TQM but have less or no experience on the field yet. The problem of applying tqm in research institutes apparently lies in the characteristics of their tasks. What is to be noted according to the two authors is, that it is important for research laboratories to benefit from a quality system that is adjusted to their needs, in order to improve their performance but also to obtain a quality label. That means new strategies, improved structure and business process, and maybe most of all, need for experience to set up a quality system. More specifically, it is obvious that an effective and

efficient quality system has to conform to the specific situation and processes of a research institute. For this reason, it is argued that there may never be a standard quality system. However, a neutral basic structure can be found which is suitable for most institutes and which is basically derived from the experience collected when investigating tqm within a research organization from various points of view.

Pfeifer and Wunderlich (1997) also point out that the success of the execution of a quality system in a research institute depends strongly on the attitude of management and employees alike, as it has already been stated above. Someone who approaches the introduction of a specific quality system half-heartedly and who sees the application of standards only as an annoying duty really misses a unique opportunity to analyze their own business processes and to improve performance by a systematic reorganization. Also, according to Gilmour and Ammons (1992), implementing tqm on a complete basis is a truly massive undertaking and requires an incredible and sustained commitment from the top to the bottom of the organization. This commitment and recognition of its far reaching results has to be made without reservation.

As presented by Diez (2000), the actual significance of research institutions in the support of firms' innovation processes is unfortunately smaller than revealed in the innovative networks. This fact stresses even more the need to strengthen their involvement. Due to the globalization of economic activities firms are constantly forced to introduce new and innovative products on the market which are influenced by the national and regional environment. So, an increasing interaction between different actors, such as research institutes, through their inter- and intraregional networks, will make them able to act as knowledge providers, diffusing knowledge from science to businesses, and facilitating access to internationally available sources of knowledge. Additionally, it has to be stated that research institutes are providers of a highly skilled work force.

Moreover Diez (2000) has stressed that public research institutes, such as the universities, face new challenges because higher education is no longer a matter of the elite. There is a new emphasis on lifelong learning in every field. For example, research institutes could play an important role by transmitting knowledge to the local economy especially for small and medium

enterprises. Firms in regions with an excellent research infrastructure have a statistically higher tendency to be the first to use the results from recent research efforts conducted by the research institutes.

Representative studies on the real involvement of research institutes in the innovation activities of businesses are lacking. There is no doubt about the importance of research institutes, in training highly qualified staff. However, if research institutes are to play a leading role in supporting innovation processes, then the structures for research institutes must change in such a way that cooperation with businesses becomes a matter of course.

Bayraktar et al. (2008) stress that while TQM has been used in the manufacturing area for a long time, service applications of TQM, such as the ones of research institutes towards people and society in this case, are relatively new. Nevertheless, implementation of TQM principles is also applicable to higher education, as a field that promotes and realizes research as well. Higher education, just as research institutions, have all been driven by increasing commercial competition imposed by economic forces, namely market orientation. In addition, increasing productivity and delivering higher quality services to both internal and external customers are emerging as absolute necessities today.

Something very important that Bayraktar et al. (2008) have stressed is that major reasons for failure may be due to implementation of TQM programs without a full grasp of the nature of an institute. In the implementation of TQM in higher education institutes for example (field very close to its nature with research institutes), there are a number of difficulties, such as lack of agreement on the meaning of quality, academic freedom, unwillingness to change, a state of dissociation, lack of competition and conformance to minimum requirements. Measurement is also an important issue for TQM applications. Many TQM concepts such as customer satisfaction and employee involvement are difficult to be systematically measured in this special environment. The same difficulties apply to research institutions as they work under similar logic to the one of higher education institutes, considering that the personnel of research institutes originates from higher education institutions.

The above is further supported by Furman, Kyle, Cockburn and Henderson, (2003) who stress that the existence of spillovers, which means the overall knowledge generated from research field, affects the motivation of firms to do research and development. Similarly, according to Guan, Yam and Mok (2005), industrial innovation and its effective diffusion plays a vital role in the economic development of Western countries as well as of China though their economies are operated under different social and economic systems. The linkages among universities, research institutes and industry constitute significant portions of regional as well as national innovation systems. Therefore, improved collaboration between them is vital for the competitiveness of a country. It has been proved that collaboration between industry and research institutes/universities is helpful in reducing the cost of Research and Development, decentralizing risks, and facilitating these organizations to share resources and achieve complementary capability. One of the major barriers to collaboration is inefficient communication of research results from research institutes/universities. This indicates there are serious problems in the information channels between public institutions and industry, so it is necessary to develop an effective information platform among the collaboration partners. These findings from the literature support the opinion of how important it is to actually pinpoint the current extent of use of total quality management in institutes so as to improve their function as organizations.

According to Sakthivel, Rajendran, and Raju (2005) what made USA what it is today – a powerful nation in the world- is education combined with hard work to translate that education into development. The root of national wealth of USA is due to the excellent technological knowledge. TQM is universal and proven by many successful firms. Similarly to the industrial context, the customer is the ultimate judge of quality, and that has to apply in the academic context as well. TQM is customer-focused and revolves around the concept of customer. More specifically, customer satisfaction is the leading criterion for determining the quality actually delivered to customers which is the result of the fact that TQM is an all-inclusive quality management strategy that involves support staff as well as academic staff. It focuses on all organization activities. As the name implies, it is a total approach that

encourages concentration on the core activity of an organization when making efforts to embed quality within a culture.

Moreover Sakthivel et al. (2005) also refer to the fact that in the area of higher education, such as the area of research institutes and universities, the concept of what dimensions constitute quality has not been thoroughly addressed, although some interesting studies exist. Earlier studies identified limited use and poor approaches to TQM in higher education. The problem stemmed from lack of appropriate and existing comprehensive quality management models in higher education. Amongst the most important factors affecting TQM implementation is management commitment, as has been stated above. The importance of top management commitment is believed that should be synonymous with commitment to quality assurance and successful translation of ideals into practice.

According to Siu, Lau and Cheung (1999), quality has been defined as "conformance to requirement" (Crosby) or "satisfying customers' needs" (Deming). This concept has spread out from production to servicing, and then to education and research. There have been new books on education, shifting from the passive memorizing and lecturing techniques to active learning and group discussion. A number of publications on Education Excellence and TQM in higher education have emerged, but few focused on laboratories or support services. Nevertheless, laboratory work forms an integral part of the learning process, especially for subjects in science, engineering and technology. Indeed, to reinforce quality education, support services for laboratories such as provision and maintenance of facilities, and equipment calibration must incorporate a robust quality system. As tertiary education institutions are launching TQM campaigns, the ISO 9000 certification of laboratory support services is a step taken to enhance the quality culture and contribute to achieving the institutions' missions. Also, this enables the research work to be interfaced smoothly with the commercial and industrial sectors. Compared with private enterprises, only a few obstacles which these companies confront are likely to be encountered by the laboratory support services. The environment is more or less the same as similar units exist in the public sector, except that at present there is a lack of motivation and driving force for commitment.

According to Marshall (2006), research of literature has shown that there has been significant growth of the standards of management, despite the pluralist and contingency theorists supporting a less mechanistic approach to management. The growth of management standards is closely linked to Total Quality Management. Existing management standards continue to evolve and new standards are devised that encompass new areas of management activity.

According to Pun and Gill (2002) another challenge lies with the specific ways to close gaps in the management practises against world class performance. Traditional evaluation and measurement systems solely focused on functional outcomes and overall financial performance may fail to provide an integrated management approach with the necessary feedback that employees need to improve their performance. A firm needs to have clear vision and values that detail how they are to be communicated to and shared with everyone. Managers and workers alike will not change easily unless they can be personally involved and take ownership of the change effort.

As Baxter and Jack (2008) have pointed out, an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources, ensures that the issue is not explored through one lens, but rather through a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood. A topic of interest must be well explored so that the essence of a phenomenon is revealed. The same applies to eventually using TQM effectively in research institutes. Great effort, time and education are needed.

According to Drennan (2001), promotion criteria in higher education institutions focus on performance in teaching, research and administration. Meanwhile, the prevailing perception is that research performance is the true discriminator. The study demonstrated that academic staff, with responsibility for the management and development of quality in learning and teaching, continue to perceive research as the main route for career advancement because funding councils favour large institutional awards for excellence in research. Only when the difference between rewards is narrowed will the tension be reduced.

According to Mann (2008), although there has been a great deal of literature and publicity with regards to TQM, the perceptions of its contents and methods of implementation can differ widely. This undoubtedly leads to confusion when organizations are trying to decide on which approach to use and which quality activities to implement. It is hoped that the research shown within this paper will improve the general understanding of the application of TQM in research institutes, by showing some quality areas of the organisation to address. The research findings add to this information by showing key quality activities of TQM.

Das, Paul and Swierczek (2008) have shown that there is an agreement that by implementing TQM, the overall effectiveness and performance of an organization can be improved. There is less agreement about the primary constructs of TQM, or about the overall concept of TQM. No uniform view of TQM exists so far, since TQM has been described differently by different people. Almost all the quality awards recognize the crucial role of top management leadership creating the goals, values and systems to satisfy customer expectations and to improve performance of organizations. Top management plays an important role in changing the organizational climate by providing leadership, support and also by face-to-face communication. Top management should actively develop quality plans to meet business objectives; communicate company philosophy to the employees and involve them in the TQM effort and improvement activities; encourage employees to achieve their objectives; ensure adequate resources for employee education and training.

Furthermore, Dimitriades (2000) points out that the concept of employee involvement in a traditional vs a TQM environment has been a subject of extensive research and academic scrutiny since the 1960s-1970s. Traditionally, employee involvement has been conceptualised as the process of developing "a feeling of psychological ownership among organizational members" and has been implemented via the participation of employees in information processing, decision making and/or problem solving. Employee involvement programs can take a variety of forms including: job participation, consisting of permanent programs in which employees take a formal, direct role in decisions relating to job issues; consultative participation, including

long-term interventions like quality circles and employee suggestion schemes, in which employees' opinions are sought as managers engage in decision making; representative participation, in which employees elect councils or board members to represent their interests to management; downward communication, through newsletters and team briefings; and various forms of financial participation via gain sharing, profit-sharing and employee ownership schemes.

Therefore Dimitriades (2000) points out that underlying the traditional employee involvement approach there appear to be two major objectives: The first is to create positive attitudes towards the organization, to create a sense of identity with the organization and its goals and to do this through individual-organization linkages. The key goal is therefore a high degree of organizational commitment. The second objective is to use the commitment and involvement in the success of the enterprise to encourage suggestions for improvements in performance and to encourage acceptance of management initiatives for changes in working arrangements. Except within the narrow confines of a specific job, it is management usually that retains all the decision-making power; employees are encouraged to make suggestions and, with management permission, may sometimes be encouraged to implement them. But management retains the ultimate control. Within a TQM environment, employee involvement has been conceptualised as the process of "achieving broad employee interest, participation and contribution in the process of quality improvement". It is claimed that employee involvement in quality management can take various forms, including: extrinsic involvement, where employees' participation and contribution to continuous quality improvement is linked with a system of collective TQ-oriented rewards, comprising extrinsic monetary and/or nonmonetary rewards (e.g. recognition).

There are two basic views on this issue: the first argues that since the financial success of a TQM company is the outcome of a collective continuous improvement effort it ought to be shared between the organisation and its members via the development and implementation of gain-sharing, profit sharing and employee-ownership schemes. However, the quality management literature assumes that "employees are keen to participate in the pursuit of quality improvements with little concern for extrinsic rewards".

Furthermore, it is claimed that "popular schemes such as performance related pay may, at the individual level, oppose the ideas of cooperation and teamwork supported by TQM". In addition, companies following quality improvement programs sometimes suggest that since continuous improvement is "a normal part of employees' work" they should not be additionally rewarded. The objective sought under the TQ involvement approach is to enhance internal and external customer satisfaction (through continuously improving quality) by developing a more cooperative, creative and innovative work environment. Employee involvement within and between levels and functions becomes a way of life, with ongoing multiple skills training on problem solving and group processes, and team-based reward systems utilising a variety of customer-driven, intrinsic and extrinsic monetary and non-monetary rewards.

Concerning the concept of teams in tqm environment, which is another term that is important for the current study to be determined, Dimitriades (2000) explains that the concept of teams and teamwork is of central importance to quality management. A team is a small number of people with complementary skills who are committed to a shared purpose, collective performance goals and a common approach for which they hold themselves mutually accountable. There are two main types of team in TQM: policy deployment teams and task teams. Policy deployment teams include quality councils; process quality teams; and quality improvement teams. They are concerned with shaping, planning and implementing quality goals, policy and strategy: Their purpose is to determine the relevance of every function and everyone's day-to-day job in terms of the organisation's quality goals and associated action plans. Deployment teams review and discuss changes in the light of top management's quality vision, usually summarised in a quality mission statement. The aim is not so much to produce statements over which everyone is agreed, but to have a clarification of organisational purpose and how this translates to quality tasks. Task teams comprise problem-solving and self-managed teams. Problem-solving teams are probably the most common types of teams used in TQM. As their name implies, problem-solving teams work to improve quality by solving specific quality problems facing the

organization. Problem-solving teams comprise quality improvement teams, quality circles and/or quality project teams.

Dimitriades (2000) explains that there is also an alternative type of task teams used in quality management is self-managed teams, also known as self-directed teams or autonomous work groups. Unlike problem-solving teams, self-managed teams replace rather than complement the traditional organization of work. In place of first level supervisors and a set of employees with narrowly defined jobs, is a set of associates with broad responsibilities, including the responsibility to manage themselves. In the absence of a supervisor, self-managed teams often handle budgeting, scheduling, setting goals, and ordering supplies. Some teams also evaluate one another's performance and hire replacements for departing team members.

If quality scholars and professionals wish to understand and advance the contribution of total involvement to continuous quality improvement they need to develop and use measures that will reliably assess this construct. The theoretical framework suggested here is intended as a thought provoking beginning to this promising area of inquiry for future empirical research. Future research with sophisticated designs is needed to identify the extent to which total involvement in TQM can influence the success or otherwise of such programs, and hard evidence of improvements in process quality, product quality and service due to total involvement is clearly required.

Concluding, the literature review presented above has attempted to show that total quality management philosophy that includes a vast pool of tools, techniques, policies and procedures, has a lot to offer to the field of research institutions, as has been proven for fields that are either related in function or collaborative to them. Therefore it is essential to realize that a starting point for evolution in the area of research institutes is first of all to document whether any quality management philosophy is being used and to what extent, so that this can become the pillar of further understanding and consequently better building. This can also be recognized as the fundamental idea underlying the birth of the current research. Assuming the extent of use of total quality management philosophy used can under no circumstance prove to be helpful towards continuous improvement. In the next chapter, methodology of the current research will be analytically presented.

III. METHODOLOGY

Introduction

A methodological framework refers to every decision concerning the selection of case sensitive scientific method of observation, experiment and in general of a data collection method in order to succeed in a complete as well as an objective interpretation of a phenomenon, a research question or in order to accept / reject certain research hypotheses that have been expressed through the exploration of specific research gaps that stem out from the existent scientific literature review about the topic (Malhotra, 2008). The data of a scientific method are distinguished in primary and secondary ones. As soon as data are being collected directly through subjects or research elements they are regarded as primary data and the referring research is considered to be a primary one. On the other side, in case a research project is focused in collecting data that derive from scientific journals and other bibliographical resources (books, web resources etc) and generally from other authors/researchers (literature review) both the research and the data are regarded secondary ones. This study is focused on collecting primary data in order to fill the gap of Total Quality Management (TQM) in the area of research laboratories that could help to apply total quality management strategies on sports organizations. This would be an explanatory study, since there is no previous research in the Greek reality.

The use of a methodological framework is multiple and has both internal and external reasons. For the research project, methodological framework entails the assurance of proper organising, proper planning as well as controlling and executing a research project (Parasuraman et. al., 2007). Organising is to sufficiently define population or sample or the specific research elements to get observed that is achieved through defining a sampling frame in order to find participants (Parasuraman et. al., 2007). As far as planning is concerned, it deals with the best allocation of research resources assuring both their maximum effectiveness and efficiency of resources (money, people, time etc). The sampling method for instance helps

researchers to best allocate their resources in order to minimise sampling error (Malhotra, 2008). With regards to the research controlling, some research objectives need to be set and accordingly some research questions or hypotheses should be investigated that lead researchers to design the research instrument for collecting the needed data (Interview, discussion axis or the questionnaire of the research) (Saunders, Lewis and Thornhill, 2003). In addition, with regards to the implementation of the research project, the data collection plan is defined in order to collect primary or secondary data that in the case of a primary research are connected with the implementation of the sampling plan (Saunders, Lewis and Thornhill, 2003). The implementation of a research is further related to the coding and decoding of data as well to the data analysis method based on the used scale or data collected (quantitative and/or qualitative data) (Malhotra, 2008).

Lastly, external audiences (third parties, researchers, academic society etc) seek to have a report of methodology that succeeds on assuring the best reliability and validity of the research through the preparation of the best possible presentation that should contain a reliable and realistic plan that is case sensitive to the research problem that especially in social sciences it depends on the current situation (Saunders, Lewis and Thornhill, 2003). Summarising, a realistic, crystal and reliable plan with regards to the methodological framework provides the optimisation of the functions of organising, planning, implementation as well as the best controlling of the research project that ensures acceptance derived from external audiences.

Data Collection Method of Primary Research

Fundamentally, there are two basic categories of primary research. The first one is based on qualitative data, whereas the second one on quantitative ones (Malhotra, 2008; p. 34). These methods could be combined in order to crosscheck any conclusions. Each method is applied by constructing different tools for collecting the respective data. In qualitative research the tool that is used refers to interviews or focus groups based on discussion axis (Parasuraman et. al., 2007). Firstly, researchers should form the specific research questions or hypotheses that are common to every method. These questions or hypotheses should be justified by using related topics derived

from previous research that are mentioned as secondary research or literature review (Malhotra, 2008). These questions or hypotheses should be afterwards answered and hypotheses are confirmed/rejected using various techniques. In qualitative research, one should classify the answers but at first it is imperative to help participants to externalise both their views and emotions about the aforementioned axis of discussion (Parasuraman et. al., 2007). Since the researcher actively takes place in the process, there is a likelihood of both biased data interpretation and information flow control (Saunders, Lewis and Thornhill, 2003). As a result, and because of the fact this method is not strictly structured, the researcher should develop a great deal of capabilities and qualities (knowledge of psychology, research experience and discipline) in order to avoid subjective results as well as bias (Parasuraman et. al).

Moreover, Parasuraman et. al. (2007) argued that qualitative research method is preferably used in Business to Consumer Markets and more specifically speaking in established products and services in order to collect data about customer intentions, behaviours, attitudes as well as perceptions. Besides, Malhotra (2008) reinforced the aforementioned researcher by supporting that the qualitative method using in-depth interviews, focus groups as well as the Delphi method is more suitable for new product development intelligence or products that customers lack of experience and researchers should be able to choose a representative sample of interviewees. Additionally, the qualitative method is the best method for Business to Business markets, since the size of the population is very small and the size of the sample to acquire is smaller comparing to Business to Consumer markets.

However, in case the resources are limited the use of the survey method is the best to collect the most reliable data (Parasuraman et. al., 2007). Since there was a considerable lack of resources and participants were reluctant to support qualitative research and scattered in various areas of Greece, the use of the Survey method fitted the needs of the research.

With regards to the proposed research method that is the quantitative one (conduct of a survey method) the basic research tool for the quantitative method is the Questionnaire, which is a text encouraging participants to

answer on various scales about their views, attitudes and behaviours about a social topic (in our case the organisations' TQM procedures and policies) (Malhotra, 2008). Simple random sampling method is the most cost efficient one to use in this research, since it provides the best value for money (The lowest sampling error at the minimum cost and time) (Franses and Paap, 2010). The rule of thumb for a business to business market is to have at least 100 questionnaires to acquire normal distribution. Finally, results are analysed using the tool of descriptive statistics and no bias is created by the interaction of the interviewee (Malhotra, 2008). So the quantitative method will be used in favour of the qualitative one. Summarising, after the questionnaire and scale is constructed (see next paragraph) no bias is created and this is a great deal of advantage to use Survey for reliable and fast results.

A Presentation of the Preferred Scale

The construct that best fitted the research topic and used in the survey was the one developed by Sashkin and Kiser (1992). The aforementioned authors have developed the Total Quality Management Assessment Inventory. This construct requires participants to express their opinions about the way organization functions in reality and not how it should ideally operate. The abovementioned scale is classified into two parts, the one that includes 10 common tools and techniques facilitated in Total Quality Management (TQM), and the other that assesses the environment of the organisation meaning the managerial operation as well as culture related to TQM. The construct is designed for the entity as a whole, not just one organizational entity; the authors in specific require participants to express their views concerning the vast majority of the organization that they have a great deal of knowledge (Gray and Starke, 1988).

More specifically, for Part I:

Statistical Process Control (SPC) is a tool for monitoring and controlling manufacturing processes. Dr. W. Edwards Deming claimed that the majority of variation in a process is due to operator over-adjustment. SPC gives operators a tool to determine when a statistically significant change has taken place in the process or when an seemingly significant change is just due to chance causes. SPC involves:

1)Determining the critical process parameters that need to be monitored

2)Setting up an initial control chart and confirming that the process is in-control, and

3)Collecting and plotting future data on the chart and interpreting the chart to determine if the process has gone out-of-control, Oakland (2002).

A Pareto chart, named after Vilfredo Pareto, is a type of chart that contains both bars and a line graph, where individual values are represented in descending order by bars, and the cumulative total is represented by the line. One of the seven tools of quality control, it is a bar graph that displays variances by the number of their occurrences. Variances are shown in their descending order to identify the largest opportunities for improvement, and to separate 'critical few' from the 'trivial many.' Also called Pareto diagram, Wilkinson (2006).

Ishikawa diagrams (also called fishbone diagrams, herringbone diagrams, cause-and-effect diagrams, or Fishikawa) are causal diagrams created by Kaoru Ishikawa (1968) that show the causes of a specific event. Common uses of the Ishikawa diagram are product design and quality defect prevention, to identify potential factors causing an overall effect. Each cause or reason for imperfection is a source of variation. Causes are usually grouped into major categories to identify these sources of variation. The categories typically include:

People: Anyone involved with the process

Methods: How the process is performed and the specific requirements for doing it, such as policies, procedures, rules, regulations and laws

Machines: Any equipment, computers, tools, etc. required to accomplish the job

Materials: Raw materials, parts, pens, paper, etc. used to produce the final product

Measurements: Data generated from the process that are used to evaluate its quality

Environment: The conditions, such as location, time, temperature, and culture in which the process operates, Dale (2007).

Quality function deployment (QFD) is a "method to transform user demands into design quality, to deploy the functions forming quality, and to deploy methods for achieving the design quality into subsystems and component parts, and ultimately to specific elements of the manufacturing process.", as described by Dr. Yoji Akao, who originally developed QFD in Japan in 1966, when the author combined his work in quality assurance and quality control points with function deployment used in value engineering.

QFD is designed to help planners focus on characteristics of a new or existing product or service from the viewpoints of market segments, company, or technology-development needs. The technique yields charts and matrices.

QFD helps transform customer needs (the voice of the customer [VOC]) into engineering characteristics (and appropriate test methods) for a product or service, prioritizing each product or service characteristic while simultaneously setting development targets for product or service, Ficalora and Cohen (2009).

Design of experiments (Taguchi method): Taguchi methods are statistical methods developed by Genichi Taguchi to improve the quality of manufactured goods, and more recently also applied to engineering, biotechnology, marketing and advertising. Ghosh and Rao (1996).

Affinity Diagram: The affinity diagram is a business tool used to organize ideas and data. It is one of the Seven Management and Planning Tools. A graphic tool designed to help organize loose, unstructured ideas generated in brainstorming or problem solving meetings. In this method, disparate but related ideas (collected in an idea generation session) are grouped (on cards or sheets of paper) into meaningful categories called affinity sets. These categories tie different concepts together with one underlying theme, clarify the issues, and provide a structure for a systematic search for one or more solutions. Also called affinity chart, Tague (2004).

Quality circles or quality action teams: A quality circle is a volunteer group composed of workers (or even students), usually under the leadership of their supervisor (or an elected team leader), who are trained to identify, analyze and solve work-related problems and present their solutions to management in order to improve the performance of the organization, and motivate and enrich the work of employees. When matured, true quality circles become self-managing, having gained the confidence of management. The term quality circles derives from the concept of PDCA (Plan, Do, Check, Act) circles developed by Dr. W. Edwards Deming. Montana, Patrick J, Bruce and Charnov (2008).

For Part II the questions that are included can be further explained according to the general literature on total quality management via basic terms which are the following: leadership, measurement and evaluation, process control and improvement, program design, quality system improvement, employee involvement, recognition and reward, education and training, other stakeholders' focus, serving the customer, continuous improvement, managing with facts and respect for people. These terms have already been defined and can be referred to in the introduction chapter.

The Sampling Procedure and Plan

The sampling procedure and plan help on putting the project to the rail in order to have both reliable and valid data collection. Saunders et. al. (2003) suggested the following processes:

i.   The definition of population

It is very crucial to avoid collecting unnecessary data out of the requested population. It is very important to know exactly the population in order to reach it properly by choosing the correct sampling frame. These facts lead to the reduction of the survey cost along with the extraction of the correct findings later on. Our population is consisted of key employees in Research Institutions that develop research projects in Greece and develop a strong opinion about the organization they work for. Key employees are the employees that are suggested to the researcher by the research institutes themselves as the most appropriate individuals to address a survey on total

quality management. The questionnaire was given to participants in its original form. The population was reached through emails, via telephone, or in person during working hours. The Research Institutes that comprised the sample are a total of 25 Institutes that belong to 7 Research Centres, grouped as follows:

1. The National Centre of Scientific Research "Demokritos" that is comprised of the following Institutes:

Institute of Nuclear Physics

Institute of Radioisotopes and Radiodiagnostic Products

Institute of Materials Science

Institute of Informatics and Telecommunications

Institute of Microelectronics

Institute of Physical Chemistry

Institute of Biology

Institute of Nuclear Technology & Radiation Protection

2. The National Centre for Social Research that is comprised of the following Institutes:

Institute of Urban and Rural Sociology (IURS)

Institute of Social Policy (INSPO)

Institute of Political Sociology (INSPOL)

3. The Hellenic Pasteur Institute (HPI)

4. The Hellenic Centre for Marine Research that is comprised of the Institutes of:

Oceanography

Marine Biological Resources

Aquaculture

Marine Biology and Genetics

Inland Waters

5. The Centre for Renewable Energy Sources and Saving (CRES)

6. The Centre for Research and Technology – Thessaly (CE.RE.TE.TH) and,

7. The Centre for Research and Technology Hellas (CE.R.T.H.) that is comprised of the following Institutes:
Chemical Process Engineering Research Institute - CPERI
Informatics and Telematics Institute -ITI
Hellenic Institute of Transport - HIT
Institute of Agrobiotechnology - INA
Institute for Solid Fuels Technology & Applications - ISFTA
Institute of Biomedical and Biomolecular Research - IBBR

ii.   The definition of sampling frame

The sampling frame is actually the pool, or better, the database from which sampling units could be retrieved. The sampling frame, if well defined, leads to a great deal of efficiency in terms of time and cost and it additionally reduces sampling error. The on-line enquiry at the General Secretariat for Research and Technology (GSRT), of the Ministry of Education, Life Long Learning and Religious Affairs, which is the main public body for the administration of the Greek R&D system, lead the researcher to extract a catalog of Research Institutes from which employees were interviewed.

iii.   The definition of the sampling method

The method to be used for acquiring the sample is the one of the simple random sampling. It reduces sampling error by simultaneously providing speed at very low cost (Malhotra, 2008; p 133).

iv.   The definition of the sample's size

The sample's size helps on reducing sampling error as well as providing realistic findings. One rule of thumb for business to business markets is to acquire a sample of 100 observations, whereas for business to consumer markets over 300 observations in order to succeed on acquiring

normal distribution (Parasuraman et. al., 2007; p. 55). As a result, the size of the sample will be about 100 cases to comply with this rule.

v. The implementation of the sampling plan

The implementation of the sampling plan considers many details about the place as well as the time implementation takes place. It also includes plans for ensuring easier data access and for overcoming ethical obstacles. (Saunders, Lewis and Thornhill, 2003). Access in Greece for research purposes is normally granted to collect data. For this reason, the researcher sent official letter asking for their permission to send the questionnaire.

Secondly, the researcher performed the sampling process in the working hours of 9 am to 5 pm when the survey population (employees) is capable of participating. Also the time required to answer the survey questionnaire is crucial, since the participants may not have much time. As a result, participants were required to fulfill the questionnaire, in its original form, guaranteeing it would not take them more than 10 minutes. Increased response rates and overcoming of any ethical issues will be assured through the preparation of a cover letter stating that the results will be used for academic purposes only and it should also underline that the questionnaire is anonymous, though no sensitive personal data are in need.

Any other researcher-related bias is limited, since the survey is a very structured method to influence data and findings (Malhotra, 2008). To avoid any, the researcher should adopt a "positivist approach" by focusing on a great deal of self-awareness/control and statistical based findings, in a manner ensuring impartiality (Saunders, Lewis and Thornhill, 2003). To avoid data manipulation during the personal interaction, researcher will not suggest any best answer and will only provide participants with instructions to complete the questionnaire.

vi. Data Coding and Entry

After questionnaires were collected, questions were coded into respective variables using certain numbers and labels. Then answers were entered in a Data Base and statistical application named SPSS V. 15 for Windows in order for Statistical Analyses to be extracted.

IV. RESULTS

In the current chapter every research finding deriving from the primary research is being presented. In Descriptive Statistics analysis there are the basic descriptive measures: mean statistics, standard deviations etc (Franses and Paap, 2010).

DESCRIPTIVE STATISTICS

Descriptive statistics analysis of survey variables that follow is based on the structure of the research instrument (that can be seen in the appendix). Descriptive statistics of Parts I and II of the questionnaire follows. Part I of the questionnaire examines the extent of use of 10 specific tools and techniques that are commonly used in TQM programs and Part II examines the extent of use of a set of 39 statements about various practices, policies, and procedures that may or may not apply to an organization. Descriptive analysis of 101 observations was made.

Part I

The minimum value was 1 (1= To little or no extent) and the maximum value was 5 (5= To a very great extent). In between values were 2 (2= To a slight extent), 3 (3= To a moderate extent) and 4 (4= To a great extent).

The mean statistics revealed that Greek research institutes use to a slight extent specific and structured quality improvement techniques (mean=2.21). Moreover, Standard deviation as a measurement of dispersion shows to what extent participants' views differ comparing to the mean average. Standard Deviation value divided by Mean value gives researchers a sense of the total level of dispersion that is the Coefficient of Variability (CV). Therefore, CV was 59.72% which shows a high value of dispersion meaning that there has been a difference of opinions for this statement and that it is not an outcome that applies unanimously to the same extent.

Participants also declared that to a slight extent they receive training in the importance of quality (mean=2.09). Again CV= 60.76% shows difference of opinion.

Also, participants indicated that to a slight extent they participate in quality circles or quality action teams (mean=1.77) where CV is as high as 62.71%. Lastly, employees declared that to a slight extent they receive training in statistical process control (mean=1.52) where CV is also as high as 56.57%. Table 1 shows the aforementioned descriptive results and Figure 1 is illustrative of the results.

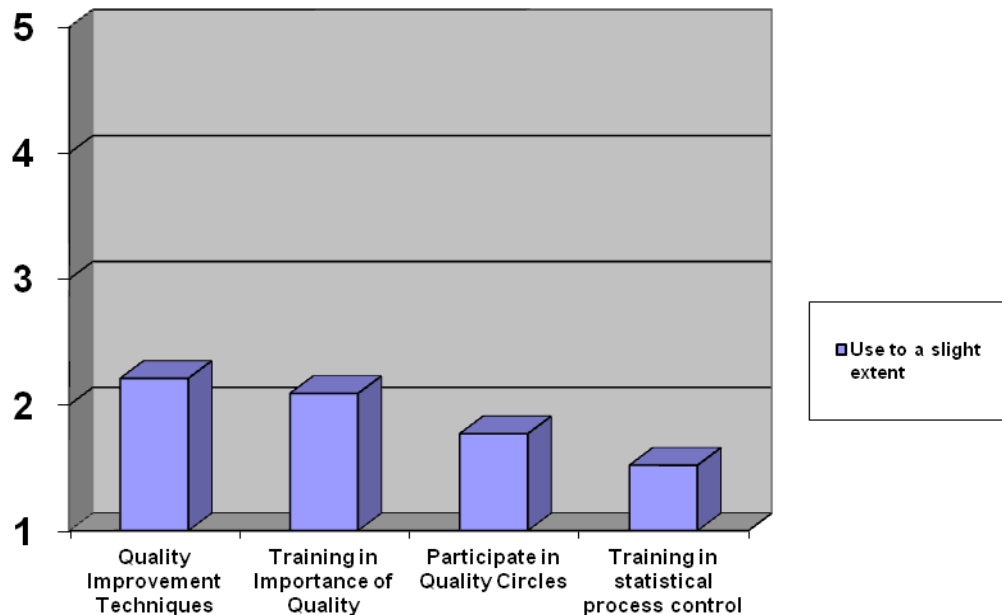| **Table 1:** Use to a slight extent					
In this organization, to what extent do people …	N	Min.	Max.	Mean	S.D.
use specific, structured quality improvement techniques?	101	1	5	2.21	1.32
receive training in the importance of quality?	101	1	5	2.09	1.27
participate in quality circles or quality action teams?	101	1	5	1.77	1.11
receive training in statistical process control?	101	1	5	1.52	0.86

Figure 1. Use of quality tools to a slight extent

Regarding the use of the rest tqm techniques and tools that are included in Part I of the questionnaire, participants declared that they use them to little or no extent. More specifically, to little or no extent they use affinity diagrams (mean=1.27). Dispersion was very high (CV = 49.60%) and as a result there is a great deal of opinion variability.

Also, to little or no extent they use statistical process control charts (mean=1.49) where CV is 55.70%, fishbone diagrams (also known as "cause/effect diagrams") (mean=1.17) with a lower value of CV that is 38.46% and to little or no extent they apply the "design of experiments" (Taguchi method) (mean=1.21), CV=44.62%. Finally, participants declared that to little or no extent they develop Pareto Charts (mean=1.17) with CV=38.46% or use the quality function deployment approach (mean=1.12) with CV=33.92%.

Mean statistics are presented in Table 2 below and Figure 2 is illustrative of the results.

Table 2: Use to little or no extent

| In this organization, to what extent do people …	N	Min.	Max.	Mean	S.D.
use affinity diagrams?	101	1	4	1.27	0.63
use statistical process control charts?	101	1	5	1.49	0.83
use fishbone diagrams (also known as "cause/effect diagrams" or "Ishikawa diagrams")?	101	1	4	1.17	0.45
apply the "design of experiments" (Taguchi method)?	101	1	5	1.21	0.54
develop Pareto charts?	101	1	4	1.17	0.45
use the quality function deployment approach (e.g., quality deployment charts)?	101	1	3	1.12	0.38
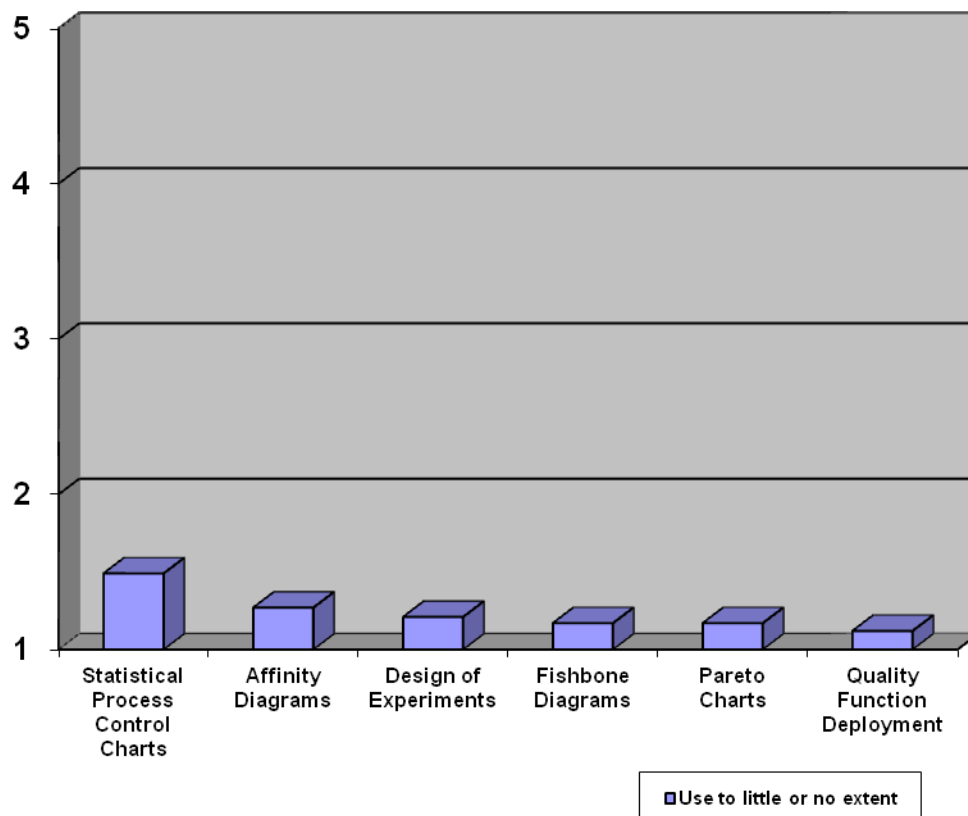
Figure 2. Use of quality tools to little or no extent

Part II

The minimum value for Part II was 1 (1= Does not apply) and the maximum value was 5 (5= Applies completely). In between values were 2 (2= Applies slightly), 3 (3= Applies partly) and 4 (4= Applies mostly). Results have been grouped in four tables, based on mean value of responses for each statement.

Table 3 shows that two policies that are applied completely in Greek research Institutions are firstly that there is no downsizing or staff reductions unless there is retirement or normal turnover in the horizon (mean=4.71)) and secondly, that – as a probable result – people feel secure in their jobs as it is unusual for anyone to be fired without a very clear cause (mean=4.69).

Moreover, Standard Deviation (SD) as a measurement of dispersion shows to what extent participants' views differ comparing to the mean average. SD value divided by Mean value gives researchers a sense of the

total level of dispersion that is the Coefficient of Variability (CV). The CV in this case is 11.04% for no downsizing or staff reductions unless there is retirement or normal turnover and 11.08% for people feeling secure in their jobs as it is unusual for anyone to be fired without a very clear cause. This shows that the majority of Greek research institutions have adopted a policy of job security via permanency. Mean statistics are presented in Table 3 below and Figure 3 is illustrative of the results.

Table 3: Applied completely

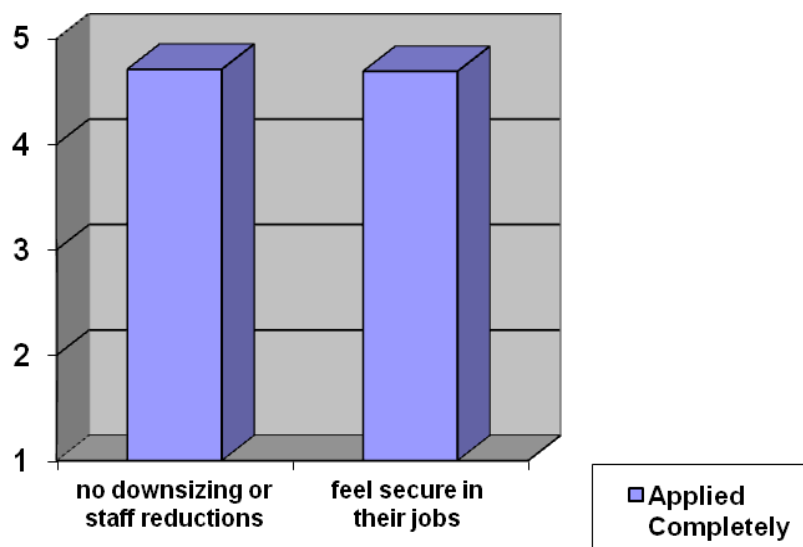| In this organization …	N	Min.	Max.	Mean	S.D.
"downsizing" or staff reductions, when called for, are achieved by retirements and normal turnover not by layoffs or firings.	101	3	5	4.71	0.52
people feel secure in their jobs as it is unusual for anyone to be fired without a very clear cause.	101	3	5	4.69	0.52

Figure 3. TQM policies and procedures applied completely

Table 4 shows the principles that are applied mostly in Greek research institutions. More specifically, employees stated that in their organization a principle that is mostly applied is that there is coordination achieved through cooperation and collaboration between individuals and among teams as well (mean=4.12). CV= 16.26% shows that this is a principle followed in a great extent in most Greek research institutions. Relatively to this policy, it is mostly applied that most work is designed to be accomplished by people working together as teams rather than by individuals working on their own (mean=3.68), but here there is a greater difference of opinion since CV is 27.98%.

Concerning individuals in higher hierarchical rank, employees stated that their managers keep their word when they agree to do something (mean=4.08). It is remarkable that there is not a great deal of dispersion (SD= 0.70, CV= 17.15%), showing the confidence that employees trust their superiors. Also, another policy concerning top management that is applied mostly is that decisions must always be cleared and approved by higher levels prior to any action (mean=3.79), but this policy seems to be less coherently followed by Greek research Institutions since dispersion here is quite higher CV=25.85% than the principle of cooperation between individuals and among teams and the principle of trust towards the face of superiors mentioned above. It also seems that even though what applies mostly is that top managers don't have lots of "perks" (mean=3.70) this policy has a high dispersion CV=36.48% therefore there is quite a difference of opinion between individuals (and probably their perception of "perks" in the workplace). This is also the case with the practice that has to do with employees at all levels generally viewing top management compensation as fair and equitable in relation to wages and salaries at lower levels (mean=3.52). Here CV is 25% therefore there is some difference of opinion. Also it seems that it applies mostly that managers let employees know what is expected of them (mean=3.66) but here as well dispersion is high CV=28.96% therefore there is also a difference of opinion among employees to consider.

Concerning procedures applied mostly that have to do with materials, it is shown that those who use the materials provided by outside suppliers or vendors are responsible for determining that such materials are of acceptable

quality when received (mean=4.03). There is a CV= 22.08% which shows the existence of some difference of opinion between employees probably due to the fact that there is indeed a great difference between institutions on the kind or type of materials used for purposes of a specific institution. Also it is applied mostly that all products or services are checked for quality by those employees who produced the items or delivered the services (mean=3.61) with a CV of 24.37% which means that there is a considerable disagreement among employees.

Mean statistics of the above mentioned policies and procedures are shown in Table 4. Figure 4 is illustrative of the results.

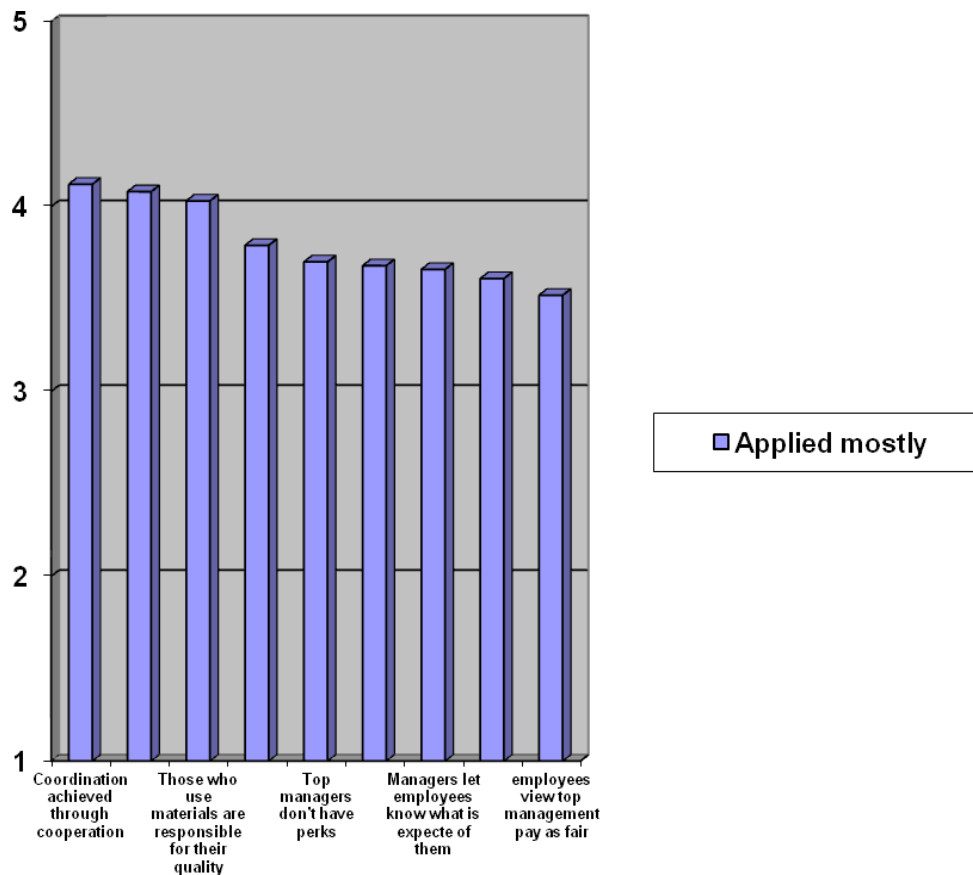| **Table 4:** Applied mostly					
In this organization …	N	Min.	Max.	Mean	S.D.
Coordination is achieved through cooperation and collaboration between and among individuals and teams.	101	2	5	4.12	0.67
managers keep their word when they agree to do something.	101	2	5	4.08	0.70
those who use the materials provided by outside suppliers or vendors are responsible for determining that such materials are of acceptable quality when received.	101	1	5	4.03	0.89
decisions must always be cleared and approved by higher levels prior to any action.	101	1	5	3.79	0.98
top managers don't have lots of "perks" (like a private dining room or special parking places) that distinguish them from other employees.	101	1	5	3.70	1.35
Most work is designed to be accomplished by people working together as teams rather than by individuals working on their own.	101	2	5	3.68	1.03
managers let employees know what is expected of them.	101	1	5	3.66	1.06
all products or services are checked for quality by those employees who produced the items or delivered the services.	101	1	5	3.61	0.88
employees at all levels generally view top management compensation as fair and equitable in relation to wages and salaries at lower levels.	101	1	5	3.52	0.88

Figure 4. TQM policies and procedures applied mostly

Table 5 shows policies and procedures that are applied partly in Greek research institutions. More specifically, it applies partly that people feel a sense of ownership over their jobs and their work (mean=3.49) and also that they get a strong sense of ownership of their work by having authority over what they do, being recognised for their achievements when possible by participating in a formal employee stock ownership plan (mean=3.41). What is also closely related with the two above is that it partly applies that the person doing the job is responsible for measuring quality and using that information to control and improve the way the work is done (mean=3.37). Also, it applies partly that the emphasis of the research organizations is on getting and using information to improve how the work is done, rather than on inspecting the quality of the final output (product or service) (mean=3.36).

35

The Greek Research Centres partly believe in and encourage competition among individuals and groups in order to achieve high performance and quality (mean=3.16) and people typically have the authority to make decisions and take actions in regard to their work responsibilities, without higher level approval (mean=2.73). Moreover, individuals and work groups treat one another as in-house customers who are entitled to top quality products or services from one another (mean=2.62) and the same partly applies for the fact that it is clear that there are "bosses" at the top and "hired hands" to do the work (mean=2.62).

Concerning research organizations' customers, participants stated that it applies partly that they constantly track customer satisfaction with their products or services (mean=3.15) and that those who do the production or service work are also responsible for assessing the quality of their finished work (mean=3.14) and that it is expected that those doing the work will take quick actions on their own say-so to improve quality or correct quality problems (mean=3.13). Therefore it applies partly that employees regularly collect quality information about their work and use it to take action to improve quality and performance (mean=3.08).

For supplies and materials used by research organizations, it is applied partly that all incoming supplies and raw materials are inspected when received, using appropriate quality measurement tools (mean=3.04). Participants have declared that it applies partly that quality improvement tools and techniques enable them to quickly determine whether quality problems are due to materials/services provided by vendors and suppliers (mean= 2.97). Moreover, it applies partly that final quality checks on products or services involve the application of statistical sampling methods. (mean=2.84) and that employees who use materials provided by outside vendors and suppliers work closely with those suppliers to measure and improve quality (mean=2.79). Therefore it is not surprising that customers are often asked to sit in on product design or service planning meetings to give their insights, reactions and advice (mean=2.70) and that it is a policy of the organisations to meet frequently with vendors and suppliers to discuss their approach to quality and our quality needs. (mean=2.68) and also, it applies partly that production and/or service personnel often travel to meet with suppliers and

vendors at their own sites, to examine their quality control procedures and help improve them (mean=2.61). Lastly it is logical that what also applies partly is that every employee is expected to use quality improvement tools and techniques (mean=2.53).

Regarding the fact that CV for all the above mentioned policies and procedures varies between 23.49% (lowest value) and 54.96% (highest value), it can be concluded that the value of dispersion is quite high and therefore there is a considerable difference of opinion for the statements that apply partly in research organisations.

Descriptive statistics of the aforementioned are shown in Table 5. Figure 5 is illustrative of the results.

Table 5: Applied Partly					
In this organization …	N	Min.	Max.	Mean	S.D.
people feel a sense of "ownership" over their jobs and their work.	101	2	5	3.49	0.82
people get a strong sense of ownership of their work by having authority over what they do, by being recognized for their achievements, and (when possible) by participating in a formal employee stock ownership plan.	101	1	5	3.41	1.02
the person doing the job is responsible for measuring quality and using that information to control and improve the way the work is done.	101	1	5	3.37	1.00
the emphasis is on getting and using information to improve how the work is done, rather than on inspecting the quality of our final output (product or service).	101	1	5	3.36	0.94
we believe in and encourage competition among individuals and groups, in order to achieve high performance and quality.	101	1	5	3.16	1.40
we constantly track customer satisfaction with our products or services.	101	1	5	3.15	1.15
those who do the production or service work are also responsible for assessing the quality of their finished work.	101	1	5	3.14	1.05
It is expected that those doing the work will take quick actions on their own say-so to improve quality or correct quality	101	1	5	3.13	1.05

|					
problems.					
employees regularly collect quality information about their work and use it to take action to improve quality and performance.	101	1	5	3.08	1.09
all incoming supplies and raw materials are inspected when received, using appropriate quality measurement tools.	101	1	5	3.04	1.27
quality improvement tools and techniques enable us to quickly determine whether quality problems are due to materials/services provided by vendors and suppliers.	101	1	5	2.97	1.18
final quality checks on products or services involve the application of statistical sampling methods.	101	1	5	2.84	1.35
employees who use materials provided by outside vendors and suppliers work closely with those suppliers to measure and improve quality.	101	1	5	2.79	1.23
people typically have the authority to make decisions and take actions in regard to their work responsibilities, without higher level approval.	101	1	5	2.73	1.09
our customers are often asked to sit in on product design or service planning meetings to give their insights, reactions and advice.	101	1	5	2.70	0.88
it is our policy to meet frequently with vendors and suppliers to discuss their approach to quality and our quality needs.	101	1	5	2.68	1.10
individuals and work groups treat one another as in-house customers who are entitled to top quality products or services from one another.	101	1	5	2.62	1.44
it is clear that there are "bosses" at the top and "hired hands" to do the work.	101	1	5	2.62	1.00
production and/or service personnel often travel to meet with suppliers and vendors at their own sites, to examine their quality control procedures and help improve them.	101	1	5	2.61	1.06
every employee is expected to use quality improvement tools and techniques.	101	1	5	2.53	1.29
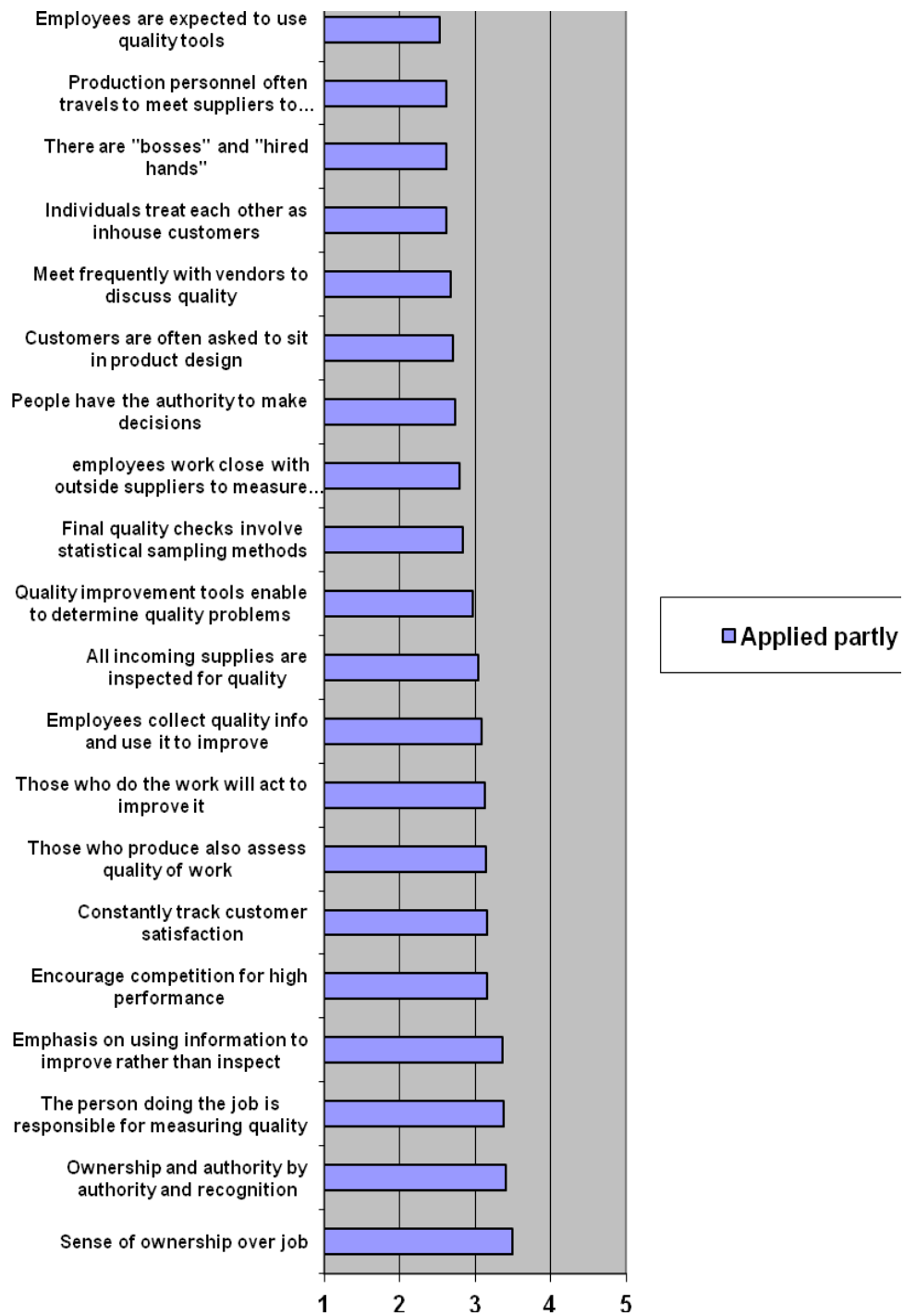
Figure 5. TQM policies and procedures applied partly

Finally, Table 6 shows policies and procedures that are slightly applied in Greek Research institutions. Concerning statements that have to do with customers, participants have stated that it is seldom that it is their policy to do a follow up with each customer after a sale or delivery, to check on satisfaction and determine whether there are any problems (mean=2.38). CV is 58.82% therefore the dispersion is great and it is not safe to assume that this is the case for every Greek institute since there is great difference of opinion.

Productivity and quality information about employees' work is collected by management to use in giving rewards or imposing punishments (mean=1.92). CV is 48.43% therefore it is not safe to conclude that this is a unanimous policy since there is great difference of opinion. Also, it applies slightly that there are many ways that people are formally rewarded for individual, team, and organizational achievements (mean=2.47). CV is 50.60% so again there is great fluctuation of opinion. It applies slightly that employees often withhold their ideas from the group or team in order to get credit and be individually recognized for any rewards (mean=2.02) and relatively to this it also applies slightly that employees at all levels share in the profits or savings achieved through their efforts (mean=2.49).

Lastly, it applies slightly that managers sometimes bend or ignore the rules for certain people (mean=2.42), and employees believe that it applies slightly that top executive pay is too high (mean=1.78) and also it applies slightly that financial difficulties are often dealt with by cost-cutting efforts that involve layoffs or permanent reductions in the work force (mean=2.02).

Descriptive statistics are presented in Table 6 and Figure 6 is illustrative of the results.

Table 6: Applied Slightly

| In this organization …	N	Min.	Max.	Mean	S.D.
employees at all levels share in the profits or savings achieved through their efforts.	101	1	5	2.49	1.05
there are many ways that people are formally rewarded for individual, team, and organizational achievements.	101	1	5	2.47	1.25
managers sometimes bend or ignore the rules for certain people.	101	1	5	2.42	1.12
it is our policy to follow up with each customer after a sale or delivery, to check on satisfaction and determine whether there are any problems.	101	1	5	2.38	1.40
employees often withhold their ideas from the group or team in order to get credit and be individually recognized for any rewards.	101	1	4	2.02	0.85
financial difficulties are often dealt with by cost-cutting efforts that involve layoffs or permanent reductions in the work force.	101	1	5	2.02	1.04
productivity and quality information about employees' work is collected by management to use in giving rewards or imposing punishments.	101	1	4	1.92	0.93
top executive pay is too high.	101	1	4	1.78	0.83
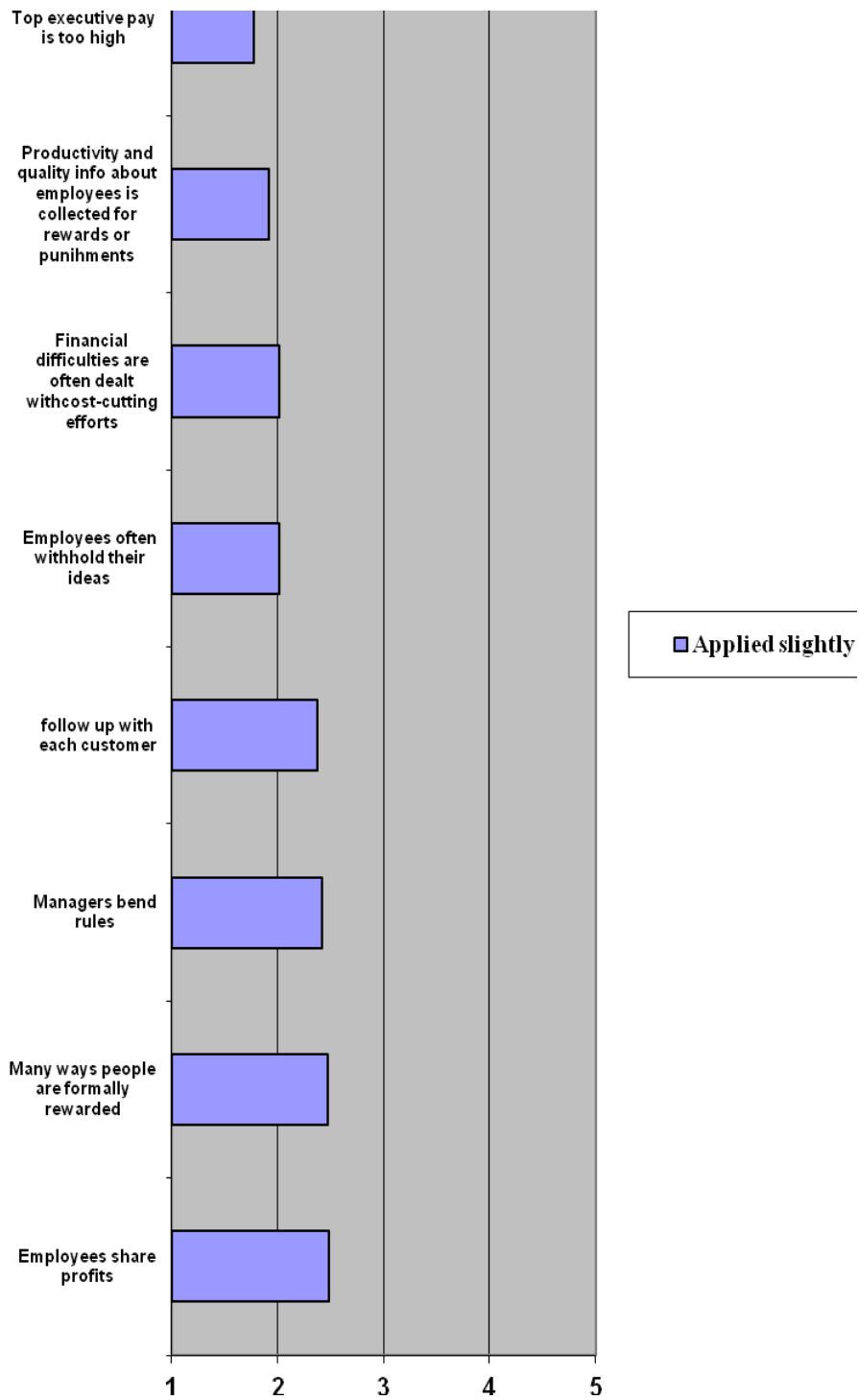
Figure 6. TQM policies and procedures applied slightly

V. DISCUSSION

The purpose of this study was to examine the extent of use of total quality management in research institutions in Greece. In order to examine to what extent total quality management is being used as a philosophy it was necessary to choose a tool that would be able to provide such evidence with specific proposed techniques and policies of total quality management.

Therefore the questionnaire chosen for this study was, the Total Quality Management Assessment Inventory by Sashkin and Kiser (1992). This idea has been supported in the literature by Bayractar et al. (2008) who claimed that TQM implementation requires developing instruments to measure multidimensional features of quality management practices. Without a proper measurement system, shortcomings of the current implementation and areas of further improvements may not be easy to identify. It is logical therefore to measure the current situation and reality of a field (such as research institutes in Greece) before trying by any means to make improvements. Improvements can only be made based on clear knowledge of the reality that exists in management philosophy and surely not on assumptions on what really goes on.

Furthermore, Das, Paul and Swierczek (2008) have also shown that no uniform view of TQM exists so far and that TQM has been described differently by different people. This made the need of measuring tqm in a field, which was the purpose of this study, even stronger. The theoretical framework suggested here was intended as a thought provoking beginning to this promising area of inquiry for future empirical research. Future research with sophisticated designs is needed to identify the extent to which total involvement in TQM can influence the success or otherwise of such programs, and hard evidence of improvements in process quality, product quality and service due to total involvement is clearly required.

Pfeifer and Wunderlich (1997) pointed out that research institutes are pressured to apply TQM but have less or no experience on the field yet. The problem of applying tqm in research institutes apparently lies in the

characteristics of their tasks. What is to be noted according to the two authors is, that it is important for research laboratories to benefit from a quality system that is adjusted to their needs, in order to improve their performance but also to obtain a quality label. That means that what is needed is new strategies, improved structure and business process, and maybe most of all, need for experience to set up a quality system.

Furthermore, the findings of this research are in agreement with the above mentioned since for the first part of the questionnaire it is shown that Greek research institutes actually do use specific, structured quality improvement techniques, receive training in the importance of quality, participate in quality circles or quality action teams and receive training in statistical process control, even if the above are used to a slight extent.

The same applies for the second part of the questionnaire where it is shown that quality culture exists in Greek research organisations in certain areas. These areas seem to be first of all applied completely in job security since downsizing" or staff reductions, when called for, are achieved by retirements and normal turnover not by layoffs or firings and since people feel secure in their jobs as it is unusual for anyone to be fired without a very clear cause.

According to Gilmour and Ammons (1992), implementing tqm on a complete basis is a truly massive undertaking and requires an incredible and sustained commitment from the top to the bottom of the organization. This commitment and recognition of its far reaching results have to be made without reservation. Almost all the quality awards recognize the crucial role of top management leadership creating the goals, values and systems to satisfy customer expectations and to improve performance of organizations, which is also shown by the results of the questionnaire saying that when a manager makes a promise, he (must) keep his word towards his employee(s), therefore there has been an agreement between the literature and the finding of this research.

The general limitations of this study can be attributed mostly to the unwillingness of the staff to participate in the research study in some cases, on the common ground of the general idea that total quality is not applied under some specific frame of work or procedure and therefore, there would be

no reason to answer any question regarding this issue. This common state of thought created a great obstacle of stalling as to the time limit of the fulfilment of the study and also showed absence of proper training of staff regarding openness to the concept of research for the improvement of the field of research institutes in the area of management philosophy.

According to Desmond (1996), there can be a contribution of universities to science-based development, from its two objectives: education and research. Its educational activity produces engineers, scientists and professionals trained under a recognized standard of excellence for employment in industry or for research and teaching. Graduates who can increase the capability of industry to fill its missions are brought to the market and research produces a new understanding of the principles on which industrial processes and products are based, which means that there can be a great improvement in training of staff as long as there is recognition of this limitation towards progress. When university and industry have open communication channels the results of basic research may offer industry new opportunities for commercial applications.

The above is in accordance with Petroni, Dormio, Nosella and Verbana (2003) according to whom an increase in productivity often came with a price; in the form of resistance (and sometimes protest) from the scientific personnel in the application of the TQM regulations. The researchers and technologists often object, for example, that the supplier-client scheme cannot adequately interpret the innovation processes which is really more complex than that which is taken into consideration by the TQM regulations, which seem to be more suited to the representation of the dynamics of the production processes.

This is in accordance to the literature which shows that many social science researchers failed to measure attitudes and behaviors accurately because of the influence of other persons influencing the answers (Malhotra, 2008). Zain, Dale and Kehoe (2001) also point that the research outputs are mainly in the form of guidelines and frameworks and little attempt is made to build upon previous research to create a meta model of TQM. It is also pointed out that there is little attempt to speculate on what the next generation of quality tools, techniques, and paradigms will look like. Research tool

construction is another obstacle to be overcome, since items should be carefully expressed, positioned and written in a manner to be quickly understood and not to require any direct sensitive information (Franses and Paap, 2010). Finally, data access as well as time seemed to be the major practical and empirical obstacle for the research project (Saunders, Lewis and Thornhill, 2003), which include every difficulty to reach the sampling units in order to find the proper sample.

Concluding, it is clear from the findings of the research that in Greek research institutes some total quality management tools are used to a slight extent but with a great variability of opinion among the institutes. Lastly, it is clear that in the general environment of Greek research institutions as organizations there is a number of policies and procedures that are completely, partly or slightly applied also with a great variability of application.

According to Petroni et al. (2003) the literature on the TQM systems applied in research and development indicates two main directions along which such systems have developed that can be further studied. Firstly in some cases these systems have generated real benefits for the companies by raising the level of satisfaction of their clients. This proved to be the case with laboratories that operate directly in the market offering research services. Secondly, in the majority of cases, the TQM systems adopted make it possible to reach important lateral effects, which concern the following: the achievement of the most effective organizational set-up, a continuous comparison with the research performances of the laboratories of the most respected competitors (called benchmarking), the development of new operating systems or the improvement of existing systems (e.g. the project management, the improvement in the management systems of researchers and technologists etc.).

Soltani, Lai and Gharneh (2005) have also shown that there has in fact been a high failure rate of quality management programmes. Taken together, the various literature seem to suggest the following elements to be the roadblocks and major challenges to TQM implementation efforts in organizations:

Lack of senior management commitment and their visible participation,

Overlapping of responsibilities of leadership and as a consequent lack of vision and planning,

Limited resources and, as a consequence, satisfaction with the quick fix,

Fear of change,

Work overloads,

Lack of comprehensive quality improvement education,

Lack of customer orientation,

Lack of clarity in measurement systems/Lack of real business measurable,

Lack of a generally accepted and precise definition of TQM components,

Satisfaction with customer satisfaction, which could impede exceeding customer satisfaction,

Institutionalized quality management,

Lack of real people involvement.

In short, research by TQM scholars identified low commitment of senior management as a roadblock and major challenge to TQM success. Put simply, despite the apparently high level of interest in various forms of TQM models, the results of the majority of investigations into TQM failure suggest that a management team might be a threat to TQM success. Such instances of low commitment to TQM initiatives serve to raise in sharp form the urgent issue of conducting sound and rigorous academic research, analysis, and comment.

Regrettably, it has to be said, so far the academic community has not responded to the challenge. Remarkable though it may seem, there is simply no serious extended treatment available on why top management commitment dropped off so dramatically. Or why isn't top management clamouring to adopt and be aware of its critical role? Until now, it has been very hard to locate material that attends to these issues in a searching and critical fashion.

If TQM is seen to be implemented effectively, one final question remains and this relates to the issue of context-free versus a context-dependent approach to TQM. As the literature on TQM shows, this is one of

the most often-cited issue of TQM. Despite the host of examples of take-up of a proper approach to TQM, its development, and implementation, there is still almost no robust evidence available about the extent to which organizations have in fact manage to tailor their TQM initiatives to their organizations' needs and requirements.

VI. CONCLUSION

This survey has revealed basic differences between the adoption of TQM tools and techniques meaning that some are more commonly used than others. More specifically it is shown that Greek research institutions use to a slight extent 4 TQM tools and techniques that are of a rather general nature. These were found to be: receiving training in statistical process control, using specific, structured quality improvement techniques, receiving training in the importance of quality and participating in quality circles or quality action teams.

What can be considered as a suggestion for further study for the first part of the questionnaire, is for these 4 quality techniques to be more specifically defined for the field of research institutes, so that there can eventually be an agreement on how the philosophy of total quality management can actually be applied.

For the rest 6 total quality management tools of Part I of the questionnaire it is shown that Greek research organizations use them to little or no extent. These quality tools have in common that they are more advanced as concepts and of a less general nature of application. These tools were: affinity diagrams, statistical process control charts, fishbone diagrams, the Taguchi method, Pareto charts and the quality function deployment approach.

For the second part of the questionnaire it is remarkable that there are two policies that are applied completely in Greek research Institutions. First of all there is no downsizing or staff reductions unless there is retirement or normal turnover. Secondly, people feel secure in their jobs as it is unusual for anyone to be fired without a very clear cause, so it can be concluded that the majority of Greek research institutions have adopted a policy of job security.

Lastly, what applies mostly in the organization is that there is coordination achieved through cooperation and collaboration between individuals and among teams as well, and that managers keep their word when they agree to do something.

Still there is room for further study and explanation as to what is considered to be "manager" "customer" "employee" and "product" in a research organization which greatly differs from a traditional company or organization due to the fact that every research organization is probably unique in its function and existence. As Marchese (1991) also suggests tqm is not here to save a situation. It is rather anticipated to spread tqm concepts with many of the resultant benefits so it is the role of tqm people to talk people into trying their best towards that direction.

The above described policies seemed to be the stronger in use of all policies for Part II of the questionnaire. The research findings of Theyel (2000), Brah Serene and Rao (2002), Lee (2002), Jinhui, Zhang and Schroeder (2011) and Walsh, Hughes and Maddox (2002) suggested that the executive managers of organizations should restructure their cultures more towards customer and markets.

Lastly, The Sashkin and Kiser's questionnaire (1992) that was used in the survey could have the items on the inventory improved for validity purposes by factor analyzing data and publishing the results. It is important to improve or create survey instruments, such as the work done by Tabladillo (1996) who developed and examined the validity and reliability of a survey instrument based on a working model of Quality Management Climate in hospitals. The purpose for development of such a survey instrument is to provide a low-cost and simple way for any organization to understand and monitor how Quality Management has penetrated the organization.

As Roberts (1996) has mentioned a total quality management system already established, already has a logic, structure and language that may not and probably will not be appropriate for the problems and approaches in research institutes. To make matters worse, it can be that the terminology may be unfamiliar to researchers and interpretations of how the standards should be applied will consequently be made by auditors unfamiliar with research. Therefore it is imperative that research institutes actually build their own tqm system built on their own logic structure and language.

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APPENDIX A

TOTAL QUALITY MANAGEMENT ASSESSMENT INVENTORY
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Part I: Quality Tools and Techniques

Following is a list of "tools" and techniques that are commonly used in TQM programs. You are asked to indicate the extent to which each is being used in your organization. If you have never heard of a particular tool or technique then answer "to little or no extent" (LN). The same applies if you simply do not know. However, if you have heard of the tool or technique, and you know that it is being used in the organization, then try your best to give an estimate of the extent to which it is currently being used, even if it's only a guess. Try to answer with the entire organization in mind but, if necessary, think of the *largest part* of the organization that you are familiar with.

Choose the response that represents the most accurate of the following alternatives:

VG = To a very great extent   G = To a great extent
M = To a moderate extent   S = To a slight extent
LN = To little or no extent

In this organization, to what extent do people …

	To a very great extent	To a great extent	To a moderate extent	To a slight extent	To little or no extent
1. … use statistical process control charts?	VG	G	M	S	LN
2. … develop Pareto charts?	VG	G	M	S	LN
3. … use fishbone diagrams (also known as "cause/effect diagrams" or "Ishikawa diagrams")?	VG	G	M	S	LN
4. … receive training in statistical process control?	VG	G	M	S	LN
5. … use specific, structured quality improvement	VG	G	M	S	LN

techniques?					
6. … receive training in the importance of quality?	VG	G	M	S	LN
7. … use the quality function deployment approach (e.g., quality deployment charts)?	VG	G	M	S	LN
8. … apply the "design of experiments" (Taguchi method)?	VG	G	M	S	LN
9. … use affinity diagrams?	VG	G	M	S	LN
10. … participate in quality circles or quality action teams?	VG	G	M	S	LN

Part II: Characteristics of the Organization

Following is a set of statements about various practices, policies, and procedures that may or may not apply to your organization. Based on your own observations, indicate how well each statement applies. Remember, don't answer in terms of how you think things ought to be. Your answers should be based solely on your assessment of actual, current conditions.

Choose the response that represents the moist accurate of the following alternatives:

C = Applies completely   M = Applies mostly
P = Applies partly   S = Applies slightly
N = Does not apply

In this organization …

	Applies completely	Applies mostly	Applies partly	Applies slightly	Does not apply
11. … we constantly track customer satisfaction with our products or services.	C	M	P	S	N
12. … those who do the production or service work are also responsible for assessing the quality of their finished work.	C	M	P	S	N
13. … every employee is expected to use quality improvement tools and techniques.	C	M	P	S	N
14. … those who use the materials provided by outside suppliers or vendors are responsible for determining that such materials are of acceptable quality when received.	C	M	P	S	N
15. … it is our policy to meet frequently with vendors and suppliers to discuss their approach to quality and our quality needs.	C	M	P	S	N
16. … productivity and quality information about employees' work is collected by management to use in giving rewards or imposing punishments.	C	M	P	S	N
17. … people typically have the authority to make decisions and take actions in regard to their work responsibilities, without higher level approval.	C	M	P	S	N

18. … there are many ways that people are formally rewarded for individual, team, and organizational achievements.	C	M	P	S	N
19. … we believe in and encourage competition among individuals and groups, in order to achieve high performance and quality.	C	M	P	S	N
20. … people feel secure in their jobs as it is unusual for anyone to be fired without a very clear cause.	C	M	P	S	N
21. … managers keep their word when they agree to do something.	C	M	P	S	N
22. … top executive pay is too high.	C	M	P	S	N
23. … people feel a sense of "ownership" over their jobs and their work.	C	M	P	S	N
24. … our customers are often asked to sit in on product design or service planning meetings to give their insights, reactions and advice.	C	M	P	S	N
25. … all products or services are checked for quality by those employees who produced the items or delivered the services.	C	M	P	S	N
26. … the person doing the job is responsible for measuring quality and using that information to control and improve the way the work is done.	C	M	P	S	N
27. … all incoming supplies and raw materials are inspected when received, using appropriate quality	C	M	P	S	N

measurement tools.					
28. … employees who use materials provided by outside vendors and suppliers work closely with those suppliers to measure and improve quality.	C	M	P	S	N
29. … employees regularly collect quality information about their work and use it to take action to improve quality and performance.	C	M	P	S	N
30. … decisions must always be cleared and approved by higher levels prior to any action.	C	M	P	S	N
31. … employees at all levels share in the profits or savings achieved through their efforts.	C	M	P	S	N
32. … coordination is achieved through cooperation and collaboration between and among individuals and teams.	C	M	P	S	N
33. … financial difficulties are often dealt with by cost-cutting efforts that involve layoffs or permanent reductions in the work force.	C	M	P	S	N
34. … managers let employees know what is expected of them.	C	M	P	S	N
35. … top managers don't have lots of "perks" (like a private dining room or special parking places) that distinguish them from other employees.	C	M	P	S	N
36. … it is clear that	C	M	P	S	N

there are "bosses" at the top and "hired hands" to do the work.					
37. … it is our policy to follow up with each customer after a sale or delivery, to check on satisfaction and determine whether there are any problems.	C	M	P	S	N
38. … final quality checks on products or services involve the application of statistical sampling methods.	C	M	P	S	N
39. … individuals and work groups treat one another as in-house customers who are entitled to top quality products or services from one another.	C	M	P	S	N
40. … quality improvement tools and techniques enable us to quickly determine whether quality problems are due to materials/services provided by vendors and suppliers.	C	M	P	S	N
41. … production and/or service personnel often travel to meet with suppliers and vendors at their own sites, to examine their quality control procedures and help improve them.	C	M	P	S	N
42. … the emphasis is on getting and using information to improve how the work is done, rather than on inspecting the quality of our final output (product or service).	C	M	P	S	N
43. … it is expected that those doing the work will take quick actions on	C	M	P	S	N

their own say-so to improve quality or correct quality problems.					
44. … employees often withhold their ideas from the group or team in order to get credit and be individually recognized for any rewards.	C	M	P	S	N
45. … most work is designed to be accomplished by people working together as teams rather than by individuals working on their own.	C	M	P	S	N
46. … "downsizing" or staff reductions, when called for, are achieved by retirements and normal turnover not by layoffs or firings.	C	M	P	S	N
47. … managers sometimes bend or ignore the rules for certain people.	C	M	P	S	N
48. … employees at all levels generally view top management compensation as fair and equitable in relation to wages and salaries at lower levels.	C	M	P	S	N
49. … people get a strong sense of ownership of their work by having authority over what they do, by being recognized for their achievements, and (when possible) by participating in a formal employee stock ownership plan.	C	M	P	S	N

THANK YOU FOR COMPLETING THIS SURVEY!

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